

FIG.1

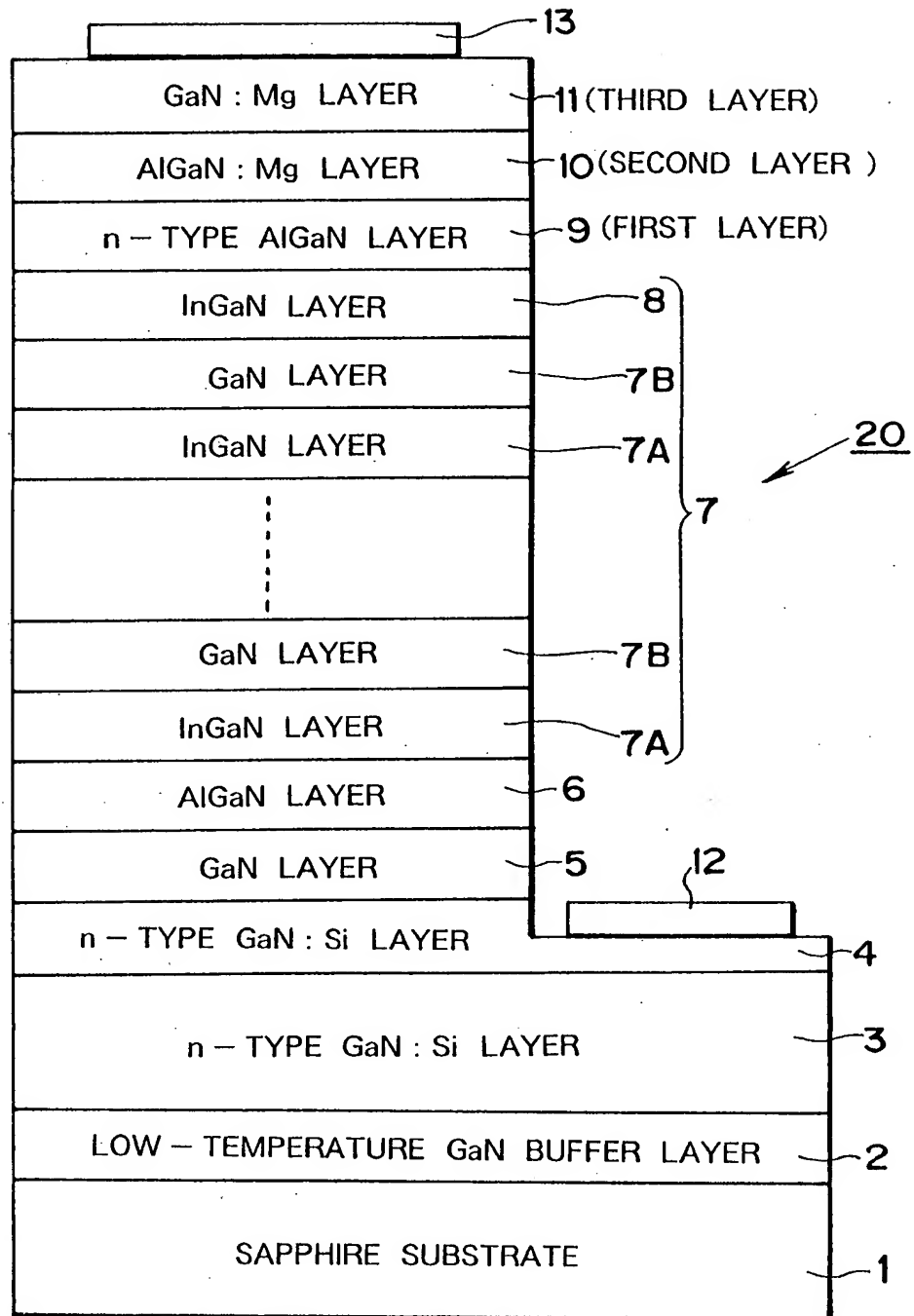


FIG.2

| | FIRST LAYER THICKNESS Å | SECOND LAYER GROWTH CONDITIONS | | | | | SECOND LAYER CHARACTERISTICS | | EMISSION CHARACTERISTIC |
|-----------------------|----------------------------|--------------------------------|----------------|------------|----------------------|--------------|-------------------------------------|------|-------------------------|
| | | GROWTH TEMPERATURE °C | THICKNESS Å | Al CONTENT | Mg FLOW RATE sccm | CONDUCTIVITY | CARRIER DENSITY cm ⁻³ | | |
| EXAMPLE 1 | 110 | 1000 | 250 | 0.05 | 600 | p | 6 x 10 ¹⁸ | 1505 | |
| EXAMPLE 2 | 110 | 1000 | 750 | 0.05 | 600 | p | 6 x 10 ¹⁸ | 405 | |
| EXAMPLE 3 | 110 | 1000 | 250 | 0.05 | 300 | p | 3 x 10 ¹⁸ | 1459 | |
| EXAMPLE 4 | 110 | 1000 | 250 | 0.05 | 100 | n | 1 x 10 ¹⁷ | 280 | |
| COMPARATIVE EXAMPLE 1 | 110 | 1000 | 750 | 0.05 | 100 | n | 1 x 10 ¹⁷ | 75 | |
| EXAMPLE 5 | 110 | 900 | 250 | 0.05 | 600 | p | 5 x 10 ¹⁶ | 640 | |
| EXAMPLE 6 | 110 | 800 | 250 | 0.05 | 600 | n | 5 x 10 ¹⁵ | 334 | |
| COMPARATIVE EXAMPLE 2 | 110 | 900 | 750 | 0.05 | 600 | p | 5 x 10 ¹⁶ | 172 | |
| COMPARATIVE EXAMPLE 3 | 110 | 800 | 750 | 0.05 | 600 | n | 5 x 10 ¹⁵ | 90 | |
| EXAMPLE 7 | 110 | 800 | 250 | 0.15 | 600 | n | 5 x 10 ¹⁵ | 499 | |
| EXAMPLE 8 | 55 | 800 | 250 | 0.15 | 600 | n | 5 x 10 ¹⁵ | 707 | |

FIG.3

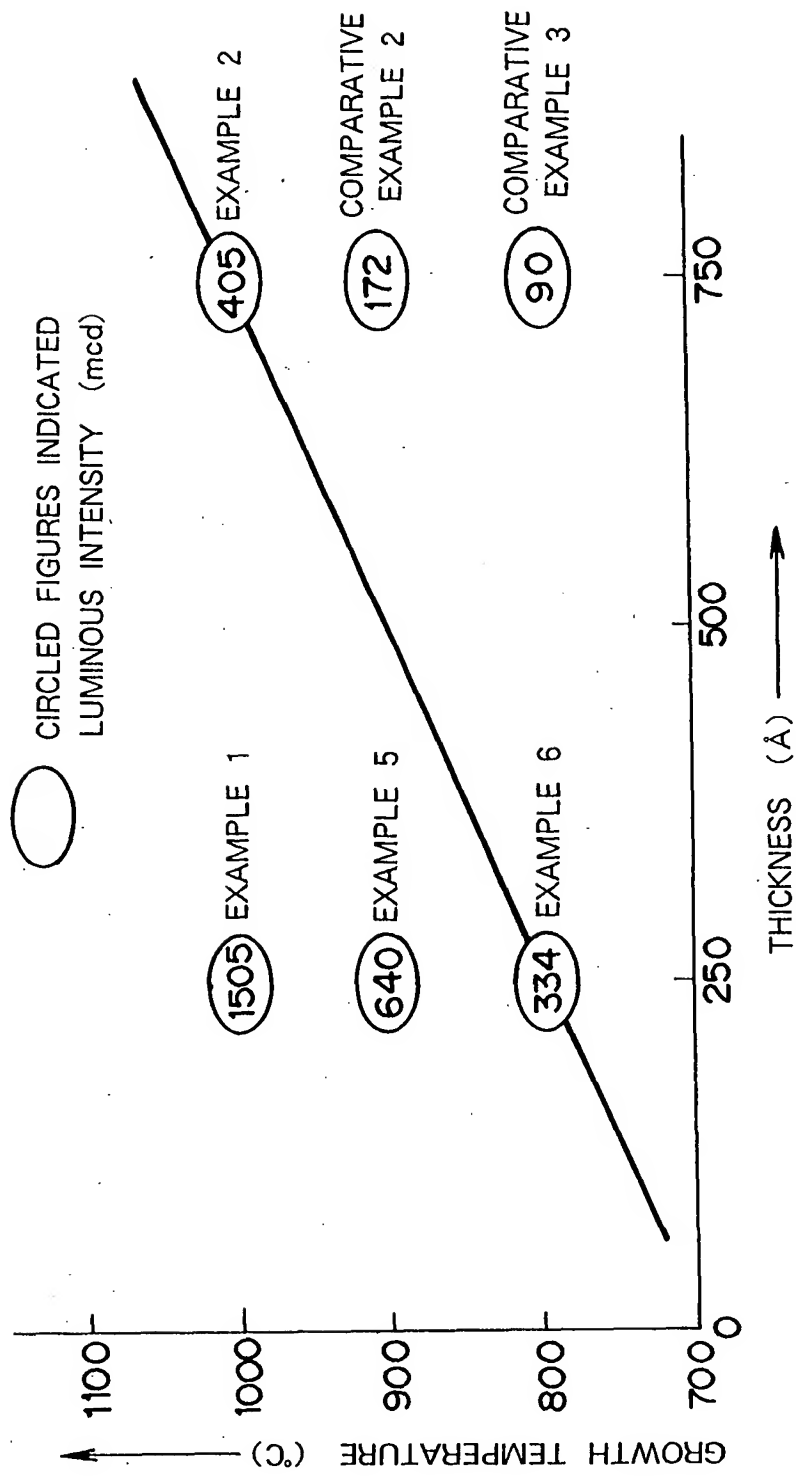


FIG.4

| | FIRST LAYER THICKNESS Å | SECOND LAYER GROWTH CONDITIONS | | | | SECOND LAYER CHARACTERISTICS | | EMISSION CHARACTERISTIC |
|------------|-------------------------------|--------------------------------|----------------|---------------|-------------------------|---------------------------------|--|----------------------------|
| | | GROWTH TEMPERATURE °C | THICKNESS Å | Al CONTENT | Mg FLOW RATE sccm | CONDUCTIVITY | CARRIER DENSITY cm ⁻³ | |
| EXAMPLE 9 | 180 | 1050 | 250 | 0.05 | 600 | p | 2×10^{18} | 1526 |
| EXAMPLE 10 | 180 | 1040 | 250 | 0.05 | 600 | p | 2×10^{18} | 1090 |
| EXAMPLE 11 | 180 | 1040 | 250 | 0.025 | 600 | p | 3×10^{18} | 923 |
| EXAMPLE 12 | 180 | 1000 | 250 | 0.05 | 600 | p | 6×10^{18} | 1353 |
| EXAMPLE 13 | 180 | 800 | 250 | 0.05 | 600 | n | 5×10^{15} | 994 |
| EXAMPLE 14 | 180 | 800 | 250 | 0.05 | 800 | n | 2×10^{17} | 854 |
| EXAMPLE 15 | 180 | 800 | 250 | 0.1 | 600 | n | 5×10^{15} | 1289 |
| EXAMPLE 16 | 180 | 800 | 250 | 0.15 | 600 | n | 5×10^{15} | 1051 |